PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent appln. of:	Keith C. Hong, et al.
Appln. No:	10/600,847
Filed:	June 20, 2003
For:	**ALGAE RESISTANT ROOFING GRANULES WITH CONTROLLED ALGAECIDE LEACHING RATES, ALGAE RESISTANT SHINGLES, AND PROCESS FOR PRODUCING SAME**
Group Art Unit:	1792
Examiner:	Elena Tsoy
Confirm. No.	8487
Docket No:	008-02

Commissioner for Patents
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REPLY BRIEF

Sir:

This brief is being submitted electronically on January 7, 2009 in reply to the Examiner's Answer dated November 7, 2008 in the above-referenced matter.

The Examiner's rejections are based on legal error. In particular, the Examiner has misapplied the standard of Graham v. John Deere, 383 U.S. 1 (1966), in her Section 103 analysis. The Examiner does not take a common sense approach to determining the scope and content of the prior art, the first Graham factor. In her first substantive rejection, the Examiner adopts an irrational view of the significance of the secondary reference upon which she relies and substitutes her own speculations for the actual disclosure of the primary reference. In her second substantive rejection, the Examiner

relies upon a secondary reference far afield from the field of the present invention in fashioning a hindsight reconstruction of the presently claimed invention guided by her erroneous view of the significance of the primary reference. In neither instance does she succeed in establishing a *prima facie* case of obviousness.

I. Rejection of Claims 3, 4, 7, 11, 16-21, 23, 28-32 and 36-41 Under 35 U.S.C. 103(a) Over Skadulis in View of Joedicke

In response to Applicants' argument that it would make no sense for one of ordinary skill in the art to form voids in the interior coating layers where they would not scatter light, the Examiner offers her own speculation that the interior layer in Skadulis' granules is indeed visible through the outer coating. However, the Office has the duty of supplying the factual basis of a rejection, and may not resort to speculation or unfounded assumptions. In re Warner, 379 F.2d 1011, 1017, 154 U.S.P.Q. 173 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968). The Examiner's fact finding must be supported by at least a preponderance of the evidence. Ethicon v. Quigg, 849 F.2d 1422, 1427, 7 USPQ2d 1152 (Fed. Cir. 1988).

Skadulis does not actually disclose that the Examiner's speculation is true, but the Examiner reasons that because Skadulis' Example I granules are "off-white" and his Example III granules are "gray," the color of the first layer **seems to be visible** through the outer second layer." (Examiner's Answer, page 10, second full paragraph, emphasis added). However, Skadulis does not actually describe the Example II granules as "gray" as stated by the Examiner. Skadulis actually describes them as "bluish-gray," which makes sense because he adds cobalt blue stain (col. 3, line 28) to make the outer "blue colored coating" (col. 5, line 23). The Examiner divines significance from the fact that Skadulis includes titanium dioxide to the interior layer of his Example I. However, Skadulis does not actually state why he does so, and a plausible and probably most

likely explanation is that he simply used a conventional coating formula as a starting point as the novelty lay in his second coating containing copper oxide.

Further, the Examiner is comparing apples and oranges. As shown below in Table A where the percent solids of Skadulis' coating compositions are computed, on a percent solids basis, there is almost five times as much clay (48.82 percent) as titanium dioxide (11.39 percent) in the outer layer of the Example III granules. Conversely, there is over fifty percent more titanium dioxide (31.19 percent) than clay (19.49 percent) in the outer layer of the Example I granules. The difference in the relative proportions of white titanium dioxide and dark clay in the outer layer provide a more plausible explanation for the observed difference in appearance than the Examiner's speculation about the contribution of the inner layers to that appearance.

Nothing can be objectively deduced from Skadulis' descriptions of the colors of the Example I and III granules because there are too many uncontrolled variables and a scanty, qualitative description of the granules themselves. For example, while Skadulis gives formulations for his coating compositions, the amount of coating actually applied is not disclosed. There is no disclosure as to the thickness of the layers formed on the granules. The only facts disclosed about the granules are their color (col. 4, line 49) and their algaecidal effectiveness (col. 4, lines 50-75).

Thus, the Examiner's argument that it would have been obvious to one of ordinary skill in the art at the time the invention was made to introduce microvoids into the first coating layer of Skadulis containing titanium dioxide pigment so as to be able to achieve off-white colored coated granules at reduced amounts of expensive titanium dioxide pigment must be wrong. Absent the Examiner's speculation about the facts, there is nothing in Skadulis which discloses or suggests that titanium dioxide in the inner layer contributes to the off-white color of the granules of Example I. If anything, Skadulis' complete omission of titanium dioxide from the Example III granule suggests

that titanium dioxide in the inner layer of the Example I granules has no discernable effect on the granule color because the inner layer is simply not visible.

The Examiner states her disagreement with the "argument" posed in Dr. Hong's declaration that one of ordinary skill in the art would not be motivated to add a void-forming composition to the inner coating composition in the process of the present invention to increase opacity, because commercial algae-resistant granules are typically gray in color, reflecting the use of carbon black, and thus increasing opacity would require additional carbon black pigment, rather than less as in the case of white or light-colored materials, and thus the addition of porosity to the inner coating would not improve the appearance as suggested by the Examiner. The Examiner reasons that while the reason or motivation may suggest what the inventor has done, but for a different purpose or reason, citing In re Linter, 458 F.2d 1013, 173 USP 560 (CCPA 1972), and In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990); cert denied, 500 U.S. 904 (1991). However, in this case, the Examiner's case is grounded on the Examiner's speculation that the inner layer of the granules prepared according to Skadulis' Example I "seem" to be visible, and not on any facts actually disclosed in Skadulis.

It should be noted that Skadulis' Examples are intended to exemplify Skadulis' own invention, the addition of an inorganic cuprous compound to prepare algaecidal granules for outdoor exposure. Thus, Example I employs a second coat of a copper-containing composition on top of what appears to be a conventional granule coating. Example III adds copper to the initial coating but not the second coating. The Examiner compares the amounts of titanium dioxide in the first and second coats of Example I and suggests that the presence of titanium dioxide in the first layer means that the first layer must be visible through the second layer, because the amount of titanium dioxide in the first layer (12 grams) is "slightly less" than the amount in the second layer (16 grams).

However, the amounts of kaolin and sodium silicate in each layer also differ, so that, as the computations shown below in Table A reflect, on a solids basis, there is almost **three times** as much titanium dioxide (31.19 percent) in the second layer than in the first layer (12.36 percent), assuming each weights of each coating composition are applied to the granules. Table A is derived directly from the data in the cited reference by addition and division, and is provided to concisely counter-state the facts in summary form.

Comparison of the calculated solids for Example I and Example III suggest that the inner layer is not visible through the outer layer. The amount of titanium dioxide in the outer layer of Example III (11.39 percent) is only about one third of the amount of titanium dioxide in the outer layer of Example I (31.19 percent). However, the relatively small amount of titanium dioxide in the outer layer of Example III is apparently sufficient to completely hide the dark color of the very large amount (23.16 percent) of cuprous oxide in the inner layer of Example III.

TABLE A

	Example I - first coat			Example I - second coat		
	weight (g)	solids	Percent solids	weight (g)	solids	Percent solids
titanium dioxide	12.00	12.00	12.36	16.00	16.00	31.19
kaolin	50.00	50.00	51.48	10.00	10.00	19.49
surfactant	0.01	0.00	0.00	0.00	0.00	0.00
sodium silicate (43.9 % solids)	80.00	35.12	36.16	45.00	19.31	37.63
water	20.00			20.00		
cuprous oxide	0.00			2.00	2.00	3.90
borax				4.00	4.00	7.80
cobalt stain						
Total	162.01	97.12	100.00	97.00	51.31	100.00

	Example III - first coat			Example I - second coat		
	weight (g)	solids	Percent solids	weight (g)	solids	Percent solids
titanium dioxide			0.00	7.00	7.00	11.39
kaolin	40.00	40.00	46.33	30.00	30.00	48.82
surfactant	0.01	0.00	0.00	0.00	0.00	0.00
sodium silicate (43.9 % solids)	60.00	26.34	30.51	50.00	21.45	34.91
water	25.00			25.00		
cuprous oxide	20.00	20.00	23.16			
borax						
cobalt stain				3.00	3.00	4.88
Total	145.01	86.34	100.00	115.00	61.45	100.00

In her brief, the Examiner admits that she was speculating in making her rejection (Examiner's Action dated March 6, 2007, page 2, Paragraph 2) about whether Skadulis' outer layer could be formed as a very thin layer so that it would not cover the color of the first layer (Examiner's Answer, page 12, second full paragraph). Nevertheless, the Examiner fails to try to objectively determine the significance of the cited references to one of ordinary skill in the art, and instead uses her own speculations as building blocks to erect a hindsight-guided reconstruction of Applicants' claimed invention.

The Examiner fails to consider the evidence of patentability presented by Dr. Hong's declaration, dismissing it peremptorily because the present claims do not require "dark colored granules." However, independent claim 3 does require cuprous oxide, which the declaration avers results in cured granules having "a dark brown color." (Declaration, ¶ 4). Similarly, Skadulis employs cuprous oxide (Examples I and III, col. 2, lines 37-46), and there is no objective evidence that Skadulis' inner coating layer is visible through Skadulis' outer coating layer. As noted above, one of ordinary skill in the art would be more likely to understand the opposite if Skadulis' actual disclosure were carefully considered. Thus, the evidence presented by Dr. Hong in his Declaration is highly relevant and should not have been ignored by the Examiner.

The Examiner's basis for her rejection falls far short of identifying a plausible rationale that would have led one of ordinary skill in the art from Skadulis and Joedicke to Applicants' invention. Cf. KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 82 USPQ2d 1385, 1396 (2007). This rejection should be reversed.

II. Rejection of Claims 3, 4, 7, 11, 16-21, 23, 28-32 and 36-41 Under 35 U.S.C. 103(a) Over Skadulis in View of Greenberg

The Examiner argues that Greenberg, an exemplar of the flea collar art, is reasonably pertinent to Applicants' claimed invention by redefining the problem Applicants sought to solve in making their invention. The Examiner redefines the problem into "the problem of releasing a toxicant through carrier pores." However, this "problem" does not appear in Applicants' disclosure. Instead, the specification speaks to the "continuing need for algae-resistant roofing products having algaecide leaching rates that can be controlled so that the roofing products can be tailored for specific local conditions." (page 2, lines 17-19). The Examiner confuses a possible solution to a problem with the problem itself. Again, the Examiner has refused to objectively consider the evidence of record and in so doing has made a legal error. The Examiner admits that Greenberg deals with an entirely unrelated field of invention, the flea collar art, and that Greenberg correctly read teaches away from the present invention by suggesting that the pore-making substance should be included in the material exposed to the air. Thus, one of ordinary skill in the art would have not combined Skadulis and Greenberg. Cf. Andersen Corp. v. Pella Corp., 2008 U.S. App. LEXIS 24087 at *16 (Fed. Cir. 2008).

Ignoring the actual problem addressed by the present inventors and substituting one more to her choosing, the Examiner is able to find the art "related to the controlled release of an active substance does not differentiate what is being released from a porous carrier" (Examiner's Answer, page 13) quoting a wash list of active substances from U.S. Patent 5,876,752 ("Herbig"). However, Herbig discloses the use of

interfacially polymerized membranes to cover porous substrates containing the active substance. These membranes are used to slow down the otherwise rapid release of the active substances. The time scale on which this technology is useful is on the order of hours (cf. Figures 2, 4, and 5) while the present invention is concerned about keeping a roof algae-free for years, a difference of four or five orders of magnitude. Again, the Examiner has the problem and the solution confused. If Applicants' problem is the controlled release of toxicants through carrier pores, then Herbig teaches away from Applicants' solution to that problem in suggesting that an interfacially polymerized membrane be applied to the porous substrate. Applicants do not employ such a membrane. Nor do applicants solve this "problem" as would Greenberg, by varying the surface porosity of the granules. Further, Greenberg's time scale (weeks, see Fig. 3) differs substantially from Applicants' time scale (years), objective evidence that Greenberg is not "reasonably pertinent." In addition, Greenberg expressly employs a single volatile toxicant, naled, while Applicants' algaecide long release period implies very low solubility, more evidence of a lack of reasonable pertinence.

The Examiner argues that because Greenberg teaches that the internal porosity, texture and surface porosity of the carrier must be "sufficiently coordinated" to allow a sufficient release of the toxicant from the carrier, one of ordinary skill in the art would "easily recognize" that the release rate from a bi-layer can be controlled by adjusting the porosity and thickness of each layer. However, the only means for controlling porosity disclosed by Greenberg is the addition of a "surface porosity control component" (col. 5, lines 29-59) which is added to increase the rate of release of the naled (Figure 3). Greenberg does not suggest that the thickness of his flea collars be varied, contrary to the Examiner's characterization.

The Examiner attempts to shore up her argument by citing additional, marginally relevant art. In particular, the Examiner relies upon U.S. Patent 3,961,628

("Arnold") for an "Ocular Drug Dispensing System" for the proposition that the rate of a diffusion of an active substance through a diffusive medium is generally dependent on the solubility of the drug in the diffusive medium, the thickness and porosity of the release-rate controlling material and the torosity factor (citing col. 6, lines 53-58). However, the Examiner fails to mention that Arnold is describing the characteristics of a drug being dispensed through Arnold's specific microporous materials (col. 6, lines 46-53). There is nothing in Arnold to suggest that this would apply to roofing granule coatings made from completely unrelated materials. Further, Arnold's time scale is a few hours or days because his object is to administer ocular drugs, evidence of Arnold's marginal pertinence to the present invention. Arnold is irrelevant to Greenberg because the naled is not dissolved in a diffusive medium. Apparently, it simply evaporates through the pores; there is nothing to suggest that the liquid naled diffuses through any medium.

The Examiner also cites U.S. Patent 5,888,930 ("Smith") for "Asymmetric Microporous Beads for Controlled Release" for the proposition that the rate of release of active ingredients from microporous beads may be controlled by the rate of diffusion through the relatively dense skin at the surface of each bead. Smith discloses making porous polysulfone beads for delivering insecticide (Examples 1-22). The Examiner notes that increasing the thickness of the skin or reducing its porosity generally lowers the permeability of an active ingredient through the skin. The Examiner then reasons that because Skadulis' layers must have sufficient porosity to permit some moisture to permeate each layer (i.e. both layers have very low porosity), it would have been obvious for one of ordinary skill in the art to include a gas forming compound into thick first layer using the method of Greenberg and to control the release rate by adjusting the thickness of the outer layer. However, the Examiner fails to explain why one of ordinary skill in the art would want to make the inner layer more porous. Smith teaches that the

way to control the release rate is to vary the thickness and/or porosity of the outer layer, and not to change the porosity of the inner material. If anything, for Smith, the inner porosity is simply irrelevant to controlling the release of his insecticides. The Examiner states that the first layer of Skadulis must "obviously" be thick enough to contain a sufficient amount of algaecide. However, there is simply no motivation to make it more porous. Greenberg, if anything, suggests including a gas forming compound in the outer, surface layer, and not the inner layer. The Examiner suggests that one of ordinary skill in the art would make a thick inner layer using the method of Greenberg, but fails to say why. Again, the Examiner has failed to make out a *prima facie* case. This rejection should also be reversed.

III. Rejection of Claims 12-13 and 33 Under 35 USC 103(a) Over Skadulis in View of Joedicke or Skadulis in View of Greenberg, and Further in View of McMahon

The Examiner acknowledges that the secondary reference McMahon is cited merely to show that zinc oxide is suitable for use as an algaecide in coating roofing granules. McMahon does not remedy the absence of a *prima facie* case, and the rejection should be reversed for this reason.

IV. Rejection of Claims 14-15 and 34-35 Under 35 USC 103(a) Over Skadulis in View of Joedicke, or Skadulis in View of Greenberg, and Further in View of Hojaji

The Examiner acknowledges that the secondary reference Hojaji is cited merely to show that sugar is suitable for a gas-forming material in glass compositions for roofing shingles. Hojaji does not remedy the absence of a *prima facie* case, and the rejection should be reversed for this reason.

Respectfully submitted,

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